C1, FM 8-284
NTRP 4-02.23 (NAVMED P-5042)
AFMAN (I) 44-156
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Change 1

HEADQUARTERS
DEPARTMENTS OF THE ARMY,
THE NAVY, AND THE AIR FORCE,
AND COMMANDANT, MARINE CORPS
Washington, DC 8 July 2002

TREATMENT OF BIOLOGICAL WARFARE AGENT CASUALTIES

1. Change FM 8-284/NAVMED P-5042/AFMAN (I) 44-156/MCRP 4-11.1C, 17 July 2000, as follows:

Remove old pages	Insert new pages
i and ii	i and ii
1-11 and 1-12	1-11 and 1-12
1-17 and 1-18	1-17 and 1-19
2-1 through 2-4	2-1 through 2-4
2-13 and 2-14	2-13 and 2-14
2-21 and 2-22	2-21 and 2-22
Glossary-3 and Glossary-4	Glossary-3 and Glossary-4
Glossary-7	Glossary-7
References-1 and References-2	References-1 and References-2
Index-3 through Index-6	Index-3 through Index-6
Back cover	Back cover

2. New or changed material is indicated by a star (★).

3. File this transmittal sheet in front of the publication.

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NO. 8-284
NTRP 4-02.23 (NAVMED P-5042)
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Washington, DC 17 July 2000

TREATMENT OF BIOLOGICAL WARFARE AGENT CASUALTIES

TABLE OF CONTENTS

- When was the sample/specimen collected?
- Who has maintained custody of the sample/specimen?
- What has been done with the sample/specimen at each change of custody?

CAUTION

Each change of custody must be recorded with date and time of change.

b. The samples/specimens must be appropriately packaged, labeled, and evacuated to the designated laboratory for confirmation of a BW attack. The standard chain of custody for sample/specimen evacuation is as follows:

- Sampling unit.
- Unit S2 (Intelligence Officer [US Army]), medical operations officer, or other designated person.
- Technical escort unit or other command-designated escort personnel.
- In-theater supporting medical laboratory, if in operation.
- Continental US laboratory.

1-12. Identification Methods for Biological Warfare Agents

The following are identification methods for BW agents:

- Isolation of the etiologic agent by culture (possible in one to two days for some agents).
- Detection of agents by enzyme immunoassay, mass spectrometry, animal inoculation, or other methods.
- Antibody detection (specific immunoglobulin [IgM] may appear within 3 days).
- Genome detection by PCR.
- Detection of metabolic products of the infectious or toxic agent in clinical specimens.

1-13. Therapy

★ *a. Endemic Disease versus Biological Agent.* Specific therapies are discussed for each agent. Most of these are based on standard treatment guidelines. However, some of the prophylaxis regimens and therapies recommended in this manual vary from those found in standard references and may include off-label indications. This is because—

- A BW exposure (aerosol) may produce a disease with clinical features different from the naturally occurring disease. For example, inhalation (BW) versus cutaneous (endemic) anthrax. Cases of endemic disease due to inhalation of some of these agents are rare and clinical experience is limited. Human challenge studies can be done with only a limited number of agents for obvious ethical and safety reasons. Accordingly, some of the prophylactic and treatment regimens have been developed from in vitro studies, animal models, and limited human data.
- An adversary may develop a BW agent resistant to the standard antibiotic therapy.

b. Endemic Disease Therapy. For endemic and epidemic disease therapies, see FM 8-33 and the civilian textbooks listed in the references.

1-14. Case Reporting and Epidemiological Assessment

It is imperative that clinicians report cases of suspected BW-related illnesses to the appropriate line and medical chains of command. Prompt epidemiological investigations must begin and preventive measures implemented to control the disease or reduce the number of cases.

★ 1-15. Prevention

Most morbidity and mortality from BW threat agents is preventable. Immunizations, pre-exposure chemoprophylaxes, post-exposure chemoprophylaxes, and protective clothing are available to provide protection. Personnel must have all required immunizations administered prior to entering an AO where BW agent employment is a threat. All immunizations should be administered in sufficient time to provide the initial protection before troops are deployed to the AO; when administration prior to deployment is impossible, troops must receive the immunizations as soon as the mission permits in the AO. Some immunizations are used in conjunction with pre-exposure chemoprophylaxes or post-exposure chemoprophylaxes to provide protection. The supporting PHS/PVNTMED units/staffs can assist commanders in determining which specific immunizations and chemoprophylaxes are required for the AO. The corps/division/wing/equivalent service/joint task force commander will decide whether to begin, continue, or discontinue the administration of chemoprophylaxes based on the BW threat. The intelligence officer, chemical officer, and surgeon advise the commander on appropriate courses of action. For those BW agents that a specific immunization is not available, the use of protective equipment combined with chemoprophylaxes may be employed to provide protection.

a. Active Immunization. As of January 1999, vaccines are available for the following potential BW agent threats:

- Anthrax.
- *Argentine hemorrhagic fever.

standard precautions as outlined in the Centers for Disease Control and Prevention (CDC) Guidelines for Isolation Precautions in Hospitals will be followed. If plague, smallpox, and viral hemorrhagic fevers (VHF) can be reasonably excluded on the basis of analysis of clinical specimens and environmental samples, patients may be evacuated using Standard Precautions and the disease-specific precautions discussed for each suspect BW agent in the following chapters.

(3) Biological warfare attacks may occur with multiple agents with short and prolonged incubation times (botulinum toxin, 12 to 36 hours and smallpox, 7 to 17 days). Multiple agents can lead to the presence of coinfection-acute illness with short incubation and incubating smallpox (which may declare itself after patients have been evacuated for evaluation/treatment of the short incubating disease). Therefore, consideration should be given to quarantining patients for 17 days after AE from the BW area if plague or smallpox cannot be excluded. Reevaluate patients carefully for recurrent fever or other changes in clinical status. If clinical or laboratory findings suggest prodromal or syndromic smallpox, plague, or VHFs, institute appropriate isolation until the diagnosis is clarified. Specific control measures must be applied as presented for the following diseases/BW agent casualties:

(*a*) *Plague*. Plague is an internationally quarantinable disease (IQD). Do not evacuate across international borders unless authorized by the theater surgeon. Evacuate in cohorts of plague patients only on dedicated AE aircraft; treat in theater. Pneumonic plague is highly transmissible person-to-person. Droplet precautions are added to standard precautions for patients with pneumonic plague until sputum cultures are negative.

(*b*) *Smallpox*. Currently eradicated and no longer listed as IQD. Immediately notify the line and medical chain of command upon diagnosis. Do not evacuate across international borders unless authorized by the theater surgeon. Evacuate in cohorts of smallpox patients only on dedicated AE aircraft; treat in theater. Smallpox is transmissible person-to-person. Strict quarantine is required. Standard, contact, and airborne isolation precautions are to be observed. All contacts should be vaccinated and quarantined/grouped together for at least 17 days following the most recent exposure.

(*c*) *Viral hemorrhagic fevers*. The World Health Organization (WHO) does not require quarantine for hemorrhagic fevers, with the exception of yellow fever. However, due to international concerns, do not evacuate hemorrhagic fever patients across international borders unless authorized by the theater surgeon. Evacuate in cohorts of hemorrhagic fever patients only on dedicated AE aircraft. Medical evacuation may result in increased morbidity and mortality for patients with hemorrhagic fever; treatment at a local facility is preferred. Person-to-person transmission is possible for the duration of illness. If necessary, patients may be evacuated using standard, contact, plus respiratory droplet isolation precautions.

(*d*) *Infectious disease of unknown etiology*. Evaluate patient evacuation risk based on the patients' signs/symptoms complex and theater threat list. Assume infection with the agent requiring the most stringent infection control procedures (based on the possible threats in the theater and the clinical picture). Ensure that appropriate patient care is performed while providing the crew and aircraft with the highest level of protection.

(*e*) *Summary*. In summary, many BW agent casualties may be safely evacuated using basic infection control guidelines. Plague, smallpox, and the hemorrhagic fevers pose significant challenges.

These patient movements will require approval of the destination country, over-flight privileges, and approval of any country where the aircraft will land for servicing or where patients will remain overnight. Countries from which approval is sought are bound by Article 37 of the *Geneva Conventions for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field of 12 August 1949* to ensure humanitarian treatment to wounded and sick. That should include approval under most circumstances of transit of those injured by exposure to biological agents. Additionally, some countries, notably Germany, have already developed procedures for expedited approval of transit of dangerous/hazardous goods in their air space. That information is contained in the DOD Foreign Clearance Guide. Coordination between the theater or USTRANSCOM commander/surgeon and the Department of State is required for such movements.

1-22. Aeromedical Isolation Team

The USAMRIID maintains an aeromedical isolation team (AIT). The AIT is a rapid response team with worldwide airlift capability. The AIT is designed to safely evacuate and manage patients with potentially lethal communicable diseases under high-level containment. Indications for deployment include cases of a highly contagious, lethal, or unidentified disease, including cases from a suspect BW attack. Diagnosis and medical care will be provided at USAMRIID. The AIT can only transport a limited number of patients. The AIT **CANNOT** provide for mass casualty evacuation. Such evacuation can enhance early identification of a BW agent; thus, enabling early development of treatment recommendations for medical providers in the TO. The AIT also offers a portable containment laboratory, limited environmental decontamination, and specialized consultative expertise.

★ 1-23. Investigational New Drugs and Off-Label Indications

a. On 30 September 1999, the President of the United States issued Executive Order (EO) 13139, Improving Health Protection of Military Personnel Participating in Particular Military Operations, which outlines the conditions under which investigational new drugs (IND) and off-label pharmaceuticals could be administered to US service members. This publication discusses numerous pharmaceutical products, some of which are IND. In certain other cases, licensed pharmaceuticals are discussed for use in a manner or for a condition other than that for which they are licensed (Example: An off-label indication).

b. Executive Order 13139 does not intend to alter the traditional physician-patient relationship or individual physician prescribing practices. Health care providers remain free to exercise clinical judgment and prescribe licensed pharmaceutical products as they deem appropriate for the optimal care of their patients. This policy does, however, potentially influence recommendations that might be made by US government agencies and that might be applied to large numbers of service members outside of the individual physician-patient relationship. Key summary points from EO 13139 include:

- The EO describes the Secretary of Defense responsibilities regarding the use of IND products or off-label use of products as antidotes to chemical, biological, or radiological weapons.

- The EO stipulates that the US Government will administer only FDA-approved products for their labeled uses. (However, off-label indications and IND usage rules may apply as discussed below and in other areas of this publication.)

- The EO details IND product use parameters and controls.

- The EO requires individual service member informed consent before IND administration. However, only the President may waive this informed consent requirement upon request of the Secretary of Defense if—

    - Service member informed consent is not feasible.

    - Informed consent is contrary to the best interest of the service member.

    - Obtaining informed consent is not in the best interest of national security.

CHAPTER 2

BACTERIAL AGENTS

Section I. INTRODUCTION

2-1. General

Bacterial organisms comprise the greatest number of pathogens in the list of potential BW agents. They include the etiologic agents of anthrax, brucellosis, cholera, glanders, melioidosis, plague, Q fever, and tularemia. Of these, anthrax is the most likely BW threat that troops will encounter in an AO. See Appendix B for guidance on medical management of BW agent casualties.

Section II. ANTHRAX

2-2. General

a. *Etiologic Agent*. The spores of *Bacillus anthracis*, an encapsulated gram-positive bacillus. Sporulation occurs under adverse environmental conditions and when vegetative bacteria are exposed to air; the spores are extremely hardy and can survive extremes of temperature, dryness, and flooding. When conditions improve, the spores germinate to produce vegetative bacteria.

b. *Reservoir*. The soil, with worldwide distribution.

c. *Transmission*. The stage in the bacterial life cycle, which poses a health hazard, is the spore. Grazing animals contract spores from the vegetation. Humans contract spores via contact with infected animals, their hides, wool, or other products; from ingesting contaminated meat; or from inhaling spores during the processing of wool for textiles. Biting flies in sub-Saharan Africa may also transmit anthrax to humans. Humans usually do not contract anthrax directly from the soil, unless they work with fertilizers (bonemeal) prepared from infected animals. Also, humans can contract spores from inhalation of aerosolized spores released during a BW attack.

d. *Endemic Disease*. Endemic infectious disease is contracted by inhalation, cutaneous exposure, oropharyngeal exposure, and ingestion.

(1) Cutaneous anthrax accounts for more than 90 percent of all anthrax cases worldwide. Disease results when *Bacillus anthracis* spores are introduced into the skin via inoculation of small cuts/ abrasions or inapparent skin lesions. It may possibly be introduced by biting flies. Cutaneous anthrax features a painless necrotic ulcer with a black eschar and local edema. The case fatality rate for untreated cutaneous anthrax is up to 20 percent, but with early, effective therapy is reduced to less than 5 percent.

(2) Oropharyngeal and GI diseases occur following the ingestion of anthrax spores, usually from consuming meat from infected animals. The clinical features of oropharyngeal and GI anthrax are discussed below in paragraph 2-6.

(3) Inhalation anthrax occurs when individuals working with animal hides, wool, or bonemeal inhale the spores. Also, inhalation anthrax may occur from inhalation of aerosolized spores released during a BW attack. The clinical features of inhalation anthrax are discussed below in paragraph 2-6.

2-3. Biological Warfare Agent Delivery

Aerosolized spores may be delivered by missiles, bomblets, artillery fires, point release, or airborne line release. Contamination of food and water may also be used.

2-4. Environmental Detection

Nuclear, biological, and chemical teams or other bioenvironmental engineering (BEE) personnel operating similar detection equipment accomplish detection. Preventive medicine/PHS/BEE personnel perform detection in water supplies. Detection in food supplies may be performed by veterinary, PVNTMED, or PHS personnel. Detection in animals may be performed by veterinary personnel.

2-5. Prevention

a. Pre-exposure Prophylaxis. Prevention may be accomplished by immunization plus chemoprophylaxis.

(1) *Immunization*. Anthrax vaccine is given in six doses at 0, 2, and 4 weeks and 6, 12, and 18 months, with annual boosting. A minimum of three doses administered within 6 months prior to the exposure may confer protective immunity.

★ (2) *Chemoprophylaxis*. While the FDA has not approved the use of pre-exposure antibiotics, empiric evidence indicates their use may significantly reduce morbidity and mortality. Therefore, they should be considered for use on a case-by-case basis and used as indicated for post-exposure preventive measures. Such use would require application of IND protocols (see paragraph 1-23).

b. Post-exposure Prophylaxis. Use immunization with chemoprophylaxis to prevent the clinical manifestation of the disease.

(1) *Anthrax vaccine*. For personnel who have completed the six-dose series and are up to date on boosters, or who have received at least three initial doses within 6 months prior to exposure, no additional doses are indicated, except to complete the series as previously scheduled. For personnel who have not received any immunizations, begin series and give a minimum of three doses; complete the six-dose series, if possible. Use of anthrax vaccine post-exposure requires application of an IND protocol.

★ (2) *Chemoprophylaxis*. Chemoprophylaxis is recommended as an adjunct to immunization for post-exposure prophylaxis. All personnel exposed to aerosolized anthrax should be administered Ciprofloxacin hydrochloride tablets (500 mg) orally every 12 hours for 60 days. When Ciprofloxacin

hydrochloride tablets are not available, doxycycline hyclate tablets (100 mg) should be taken orally every 12 hours for 60 days. The duration of chemoprophylaxis administration for individuals without receipt of any vaccine should be extended until they receive at least three doses of vaccine. Chemoprophylaxis should be withdrawn under careful observation and with access to an MTF with intensive care and consultative assets. If fever develops following the withdrawal of chemoprophylaxis, empiric therapy for anthrax is indicated pending etiologic diagnosis.

2-6. Biological Warfare Clinical Presentation

a. *Incubation Period*. The incubation for anthrax is hours to 7 days. Most cases present within 48 hours post-exposure.

b. *Signs and Symptoms*.

(1) *Inhalation anthrax*. Inhalation anthrax will begin with nonspecific symptoms of fever, malaise, and fatigue. A nonproductive cough and vague chest discomfort may be present. These initial symptoms may be followed by a short period of symptomatic improvement, hours to 3 days in duration. This will be followed by an acute phase, including the abrupt onset of severe respiratory distress with dyspnea, stridor, diaphoresis, and cyanosis. Bacteremia and toxemia, septic shock, metastatic infection (meningitis in approximately 50 percent of the cases), and death usually occurs within 24 to 36 hours from the onset of the acute phase.

(2) *Oropharyngeal or gastrointestinal anthrax*. Oropharyngeal or GI anthrax can occur following ingestion of food contaminated with anthrax spores.

(*a*) Oropharyngeal anthrax will present with initial symptoms of fever, sore throat, and difficulty swallowing. The disease may progress to an acute phase with symptoms including a necrotic ulcer or eschar involving the hard palate, tonsils, or posterior oropharyngeal wall, edema of cervical tissues (possibly resulting in upper airway obstruction), and cervical lymphadenopathy. Most acute cases progress to septic shock and death.

(*b*) Gastrointestinal anthrax begins with vague initial symptoms featuring fever, anorexia, nausea, and vomiting. Abdominal pain, bloody vomiting, bloody diarrhea, and possibly massive abdominal swelling (ascites) may follow these symptoms. Also, septic shock and death may follow these symptoms.

2-7. Diagnosis

During the incubation period, nasal swabs and specimens of respiratory secretions sent for PCR are the most important diagnostic specimens. During the early disease, blood and respiratory secretions may be sent for rapid identification by genetic typing (PCR). A rapid diagnostic test is available that detects toxin antigens in the blood during the acute phase. Chest x-ray may be normal or show hilar adenopathy early in the illness and may show a widened mediastinum and pleural effusions during the acute phase.

2-8. Treatment

a. *Triage Categories*. Patients presenting with initial signs of inhalation anthrax should be placed in the Immediate category, as early aggressive treatment is lifesaving. Depending on the numbers of cases and available resources, patients presenting in the acute phase of inhalation anthrax should be placed in the Immediate or Expectant categories.

b. *Medical Management*.

(1) Supportive care includes maintaining the airway, providing resuscitative fluids, and providing vasopressors as indicated for shock.

(2) Specific therapy includes the administration of ciprofloxacin (400 mg intravenous [IV] every 12 hours) or doxycycline (200 mg IV loading dose, followed by 100 mg IV every 12 hours). Specific therapy may also include administration of penicillin (4 million units IV) every 4 hours, if isolate is sensitive to penicillin.

(3) A tracheostomy is indicated for upper airway obstruction due to oropharyngeal anthrax. Surgical debridement of cutaneous lesions is contraindicated. Surgical drainage of the mediastinum for inhalation anthrax is not recommended.

c. *Prognosis*. The number of cases of inhalation anthrax occurring during the antibiotic era is too small to establish case fatality rates and efficacy of treatment. Almost all inhalation anthrax cases in which treatment was begun after onset of significantly severe symptoms have been fatal, regardless of treatment. Despite medical therapy, most patients with inhalation anthrax die within 24 hours of the onset of the acute phase of the illness. However, in nonhuman primate trials, animals have responded to aggressive therapy. The prognosis for oropharyngeal and GI anthrax is poor, with case fatality rates 50 to 100 percent, even with aggressive therapy.

2-9. Control of Patients, Contacts, and Treatment Areas

- Report all cases to line and medical chains of command.
- Employ Standard Precautions for handling, treating, and moving all active cases.
- Use sporicidal agents, such as disinfectant strength iodophors, in MTFs for general area disinfection. Antiseptic strength iodophors are not sporicidal. Hypochlorite solutions may be attenuated by organic matter, but will provide a disinfectant capability when used in a 5-percent solution. The hypochlorite solution should be replaced frequently. Autoclaving, steam sterilizing, or burning is required for complete eradication of spores.

2-10. Medical Evacuation

Patients with anthrax may be evacuated with other categories of patients. Anthrax is not transmissible person to person. Standard Precautions should be observed during evacuation.

(5) The addition of streptomycin is indicated if presentation (acute pneumonia) and sputum studies suggests plague.

c. *Prognosis*. The extent of infection will vary with inoculum, individual's underlying state of health, availability of protective mask or other respiratory protective devices, and other factors. Late activation or recrudescence can result years or decades later.

2-36. Control of Patients, Contacts, and Treatment Areas

Apply Standard Precautions in management of patients and contacts. Glanders, melioidosis, and smallpox may present with diffuse pustular rashes; strict isolation and quarantine would be indicated until smallpox can be excluded. Contact precautions are indicated while caring for patients with skin involvement. Glanders, melioidosis, and smallpox may present as acute pulmonary disease with purulent sputum. Respiratory isolation pending exclusion of plague is prudent if sputum studies disclose gram-negative bacilli with bipolar "safety pin" appearance when using Wright's or methylene blue stains.

2-37. Medical Evacuation

Patients may be evacuated using Standard Precautions following the exclusion of plague.

Section VI. PLAGUE

2-38. General

a. *Etiologic Agent*. *Yersinia pestis* (*Y. pestis*) is a gram-negative bacillus of the family *Enterobacteriaceae*.

b. *Reservoir*. The primary reservoir is rodents. Domestic cats and wild carnivores can also transmit plague to humans.

c. *Transmission*. In endemic or epidemic plague, the disease is transmitted via infected fleas from rodent to human, dog or cat to human, or person to person. Respiratory droplet transmission can occur person to person or cat to person. Respiratory transmission is enhanced in humid climates. Plague may also be transmitted via cat bites or scratches.

d. *Endemic Disease*.

(1) Bubonic plague features the acute onset of fever and prostration in association with acute, painful lymphadenitis in the lymph node group draining the site of the fleabite. A skin lesion at the portal of entry (site of fleabite) is seen in less than 25 percent of cases; clinically apparent lymphangitis does not occur. The disease progresses with bacteremia, resulting in metastatic infection, septic shock, and

thrombosis of small arteries, resulting in digital gangrene. Pneumonia due to hematogenous metastasis occurs in approximately 25 percent of cases. The case fatality rate for untreated bubonic plague is approximately 60 percent, but is less than 5 percent with prompt, effective therapy.

(2) Primary pneumonic plague occurs after inhalation of organisms, which may occur via aerosol transmission from a person or animal with secondary or primary pneumonic plague.

(3) Septicemic plague may evolve from any form of plague. It features the acute onset of bacteremia, septic shock, and thrombosis with or without antecedent lymphadenitis. Prognosis for pneumonic and septicemic pneumonic plague is poor; the fatality rate is 100 percent for untreated cases.

2-39. Biological Warfare Agent Delivery

The primary threat is by aerosol release or by contamination of food and water.

2-40. Environmental Detection

The NBC reconnaissance teams may collect the agent from an aerosol cloud. Preventive medicine/PHS/ BEE personnel may collect suspect soil or water samples. Veterinary/PVNTMED/PHS personnel may collect samples from suspect contaminated food. A plague BW attack may result in simultaneous onset of disease in humans, rodent reservoirs, and possibly domestic and wild animals not usually associated with plague.

2-41. Prevention

a. *Repellents*. Use of insect repellents, approved for human use, will provide a level of protection from bites by infected fleas.

b. *Immunization*. The currently available inactivated whole cell vaccine is not recommended for protection from the BW agent; it does not protect laboratory animals from aerosolized plague. However, the vaccine is effective in preventing bubonic plague among troops deployed in endemic/epidemic areas (see endemic disease, above).

★ *c*. *Pre-exposure Prophylaxis*. While the FDA has not approved the use of pre-exposure antibiotics, empiric evidence indicates their use may significantly reduce morbidity and mortality. Therefore, they should be considered for use on a case-by-case basis and used as indicated for post-exposure preventive measures. Such use would require application of IND protocols (see paragraph 1-23).

d. *Post-exposure Prophylaxis*. Administer doxycycline 100 mg orally every 12 hours for one week or ciprofloxacin 500 mg orally every 12 hours for one week.

2-42. Biological Warfare Clinical Presentation

a. *Incubation*. 2 to 10 days.

d. *Endemic Disease*.

(1) Clinical syndromes vary with portal of entry, inoculum, strain virulence, and the host's underlying state of health. Infection may be subclinical or fulminant. With the exception of typhoidal tularemia, the clinical syndromes are characterized by the combination of focal processes featuring ulceration at the portal of entry, and regional adenopathy involving the node groups draining the portal of entry. Following aerosol exposure, an undifferentiated febrile illness (typhoidal tularemia) or an acute pneumonia featuring fever, coughing, substernal chest tightness, and pleuritic chest pain may present. Usually, coughing is nonproductive; hemoptysis is rare. Physical findings may vary. Examination may be normal, or disclose rales, friction rubs, or findings consistent with consolidation or effusions.

(2) Pharyngeal tularemia presents as an acute pharyngitis following ingestion of contaminated food or water. The chief complaint is a severe sore throat. Physical findings include fever, exudative pharyngitis and/or tonsillitis, and possibly pharyngeal ulcers. Also, findings may include a pharyngeal membrane similar to that seen in diphtheria. Regional adenopathy may present in cervical, preauricular, and retropharyngeal node groups with occasional abscess formation.

(3) Oculoglandular disease presents following inoculation of the conjunctivae via aerosol, splashes, or direct contact (contaminated fingers). This disease presents as an acute conjunctivitis and may feature small conjunctival ulcers or papules. Complications may include corneal ulceration and dacryocystitis, but visual loss is rare. Regional adenopathy is a conspicuous feature of this illness, with preauricular or preparotid adenopathy. Severe cases of adenopathy may mimic parotiditis. Differential diagnosis should include other causes of Parinaud oculoglandular syndrome, including adenovirus infection, cat scratch disease, syphilis, herpetic infection, and pyogenic bacterial infection.

2-58. Biological Warfare Agent Delivery

The primary threat is by aerosol release, or by contamination of food or water supplies.

2-59. Environmental Detection

The NBC reconnaissance teams collect aerosol samples for supporting laboratory analysis and confirmation. Medical personnel collect medical specimens for supporting laboratory analysis and confirmation. Veterinary/PVNTMED/PHS personnel collect suspect contaminated food samples for supporting laboratory analysis and confirmation. Preventive medicine/PHS/BEE personnel collect suspect contaminated water samples for supporting laboratory analysis and confirmation.

2-60. Prevention

a. *Miscellaneous*. The military protective mask provides protection of the respiratory tract from exposure to aerosol organisms. All food must be thoroughly heated before consumption to kill any organisms. Water must be thoroughly disinfected before consumption.

b. *Pre-exposure Prophylaxis*.

• A live attenuated vaccine is available as an IND. It is given by scarification. The vaccine has been shown to be safe and effective in preventing laboratory-acquired tularemia and experimental infection in volunteers.

★ • The use of ciprofloxacin or doxycycline as a pre-exposure chemoprophylaxis may confer protection against tularemia, based on *in vitro* susceptibilities. See paragraph 1-23 for off-label indications and IND requirements.

c. *Post-exposure Prophylaxis*. Post-exposure prophylaxis following a BW attack include—

• Administer doxycycline 100 mg orally every 12 hours for 2 weeks; or tetracycline 500 mg orally every 6 hours for 2 weeks; or ciprofloxacin 500 mg orally every 12 hours for 2 weeks.

• Chemoprophylaxis is not recommended following potential natural exposures (tick bite, rabbit or other animal exposures).

2-61. Biological Warfare Clinical Presentation

a. *Incubation*. 1 to 21 days (usually 3 to 5 days).

b. *Signs and Symptoms*. The BW agent presentations of tularemia will be the pneumonic and typhoidal forms as discussed in paragraph 2-57 above. Oculoglandular disease could possibly occur following inoculation of the conjunctivae.

2-62. Diagnosis

a. Serologic testing is the preferred procedure for laboratory confirmation. Confirmation of diagnosis requires a four-fold increase in titer; serologies may need to be repeated at 7 to 10 day intervals. Agglutination tests and ELISA are also available. A gram stain of expectorated sputum is usually unrewarding; generally, the organism is not visualized on stains of clinical specimens. Cultures are not advised for diagnostic purposes. The organism does not grow on standard bacteriologic growth media. *F. tularensis* can be cultured on special supportive media containing cystine or another sulfhydryl source. However, cultures of the organism pose a significant occupational hazard to laboratory personnel. When cultures for *F. tularensis* are submitted, laboratory personnel must be alerted, as these cultures must be processed at Biosafety Level 3. Blood specimens may be submitted for mouse/egg inoculation.

b. Radiographic findings are nonspecific and may include subsegmental or lobar infiltrates, apical or miliary infiltrates, cavitation, pleural effusions, and hilar adenopathy.

2-63. Treatment

a. *Triage Categories*. Triage categories will vary according to the severity of the illness, available resources, and personnel. Patients presenting during the early stages of tularemia pneumonia are

EMT emergency medical treatment

★ **EO** Executive Order

F. *Francisella*

F Fahrenheit

FDA Food and Drug Administration

FM field manual

GI gastrointestinal

gm gram(s)

GU genitourinary

HEPA high efficiency particulate air

HFRS hemorrhagic fever with renal syndrome

HIV human immunodeficiency virus

HSS health service support

IATA International Air Transportation Association

IgG immunoglobulin class G

IgM immunoglobulin class M

IM intramuscular(ly)

IND investigational new drug

IQD internationally quarantinable disease

IV intravenous

JBPDS Joint Biological Point Detection System

JPO-BIO Joint Program Office for Biological Defense

JSLIST Joint service lightweight integrated suit technology

kg kilogram(s)

km kilometer(s)

LRBSDS Long-Range Biological Standoff Detection System

MCRP Marine Corps Reference Publication

MES medical equipment sets

mg milligram(s)

ml milliliter(s)

MOPP mission-oriented protective posture

MRI magnetic resonance imaging

MTF medical treatment facility

NATO North Atlantic Treaty Organization

NAVMED P US Navy Medical Publication

NBC nuclear, biological, and chemical

PCR polymerase chain reaction

PHS public health service

PPW patient protective wrap

PSP paralytic shellfish poisoning

PVNTMED preventive medicine

Q fever Query fever

QSTAG Quadripartite Standardization Agreement

RDIC resuscitation device, individual chemical

RNA ribonucleic acid

S. *Staphylococcus*

S2 Intelligence Officer (US Army)

epizootic A disease that is only present in an animal population for limited periods, but has a high morbidity rate.

etiologic Cause of the disease/illness.

inoculum The amount of microorganisms introduced into a host.

★ **off-label indication** The use of licensed medications for purposes that are not approved by the FDA. Off-label usage is common practice in general medical care.

passive immunization The administration of pre-formed antibodies to confer immunity to a specific pathogen or toxin.

sample Material collected from a source other than an animal or man for laboratory analysis (such as water sample or soil sample).

specimen Material collected from a man or animal for laboratory analysis (such as tissue or blood specimen).

Standard Precautions Handwashing after patient contact. Using gloves when touching blood, body fluids, secretions, excretions, and contaminated items. Using mask, eye protection, and gown during procedures likely to generate splashes or sprays of blood, body fluids, secretions, or excretions. Handling contaminated patient-care equipment and linens in a manner that prevents the transfer of microorganisms to people or equipment. Practicing care when handling sharps and using a mouthpiece or other ventilation device as an alternative to mouth-to-mouth resuscitation, when practical. Placing the patient in a private room if they contaminate the environment, when feasible.

toxin agents Poisonous by-products of living organisms used to cause disease, illness or death in susceptible individuals.

viral agents A group of viruses that have been selected as BW agents because of their ability to produce disease, illness, and death in susceptible individuals.

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